BOOK REVIEW

Vorlesungen über theoretische Mechanik. By D. Morgenstern and
I. Szabó. Die Grundlehren der mathematischen Wissenschaften
in Einzeldarstellungen, Band 112. Springer-Verlag, Berlin-Göt-
tingen-Heidelberg, 1961. xi+374 pp. DM 69.00.

Appearance of any book on mechanics in a mathematical series is
so unusual as to attract notice. The celebrated Yellow Series has
provided four or five such exceptions, each of particular merit, so the
volume presently under review is doubly conspicuous. While three
earlier volumes (by Whittaker, Lichtenstein, and Hamel) have been
treatises, this one chooses to follow its immediate predecessor (by
Siegel) in reproducing the contents of university courses. In every
other respect it is unlike Siegel's book. Making no attempt at Siegel's
rigor, elegance, and conciseness, the authors give a loose outline of
mechanics as a whole, provided with numerous illustrations rather
close to the surface.

The reader inclined to dismiss the book because at first glance it
seems standard and elementary would be mistaken, for it is neither.
While retaining the aspect of the old-fashioned German course of
general mechanics, it is in fact one of the first textbooks to show the
influence of the revival and rebirth of classical mechanics in the past
fifteen years. Since it is mainly a collection of examples, this review
can do no more than remark and illustrate its tone and trends.

First, it reflects the broadening and deepening of the concepts and
methods by the American school, but it does so by casual comments
rather than by structure. While mechanics for the most part seems
to mean continuum mechanics to the authors, they nevertheless
begin with separate treatments of mass-points and rigid bodies, leav-
ing the reader with the idea that there are three different systems
rather than a single, unified mechanics. They know that the principle
of moment of momentum cannot be "proved," and they develop cor-
rectly the symmetry of the stress tensor (a sure sign of very old or
very new influence). Their basic laws are the principles of mass, linear
momentum, and moment of momentum. Noll's principle of material
indifference is given prominent reference but not stated. "So as hence-
forth to avoid the common consideration of 'small elements,' which
are often so ingenious that only an expert can understand them,"
the authors base most of their general arguments on the transport
theorem, of which they give an unusually awkward formal proof.